

REMARKSOBJECTION TO DRAWINGS TRAVERSED

The section on page 2 of the Office Action objects to the drawings, alleging that certain ones of Applicant's FIGS. should be labeled as "Prior Art". Traversal is appropriate, because such FIGS. are not published prior art, and instead are simply background description provided by Applicant to aid in an understanding of the present invention. Applicant does not want to make any admissions as to prior art. If the objection is maintained in any next action, Applicant respectfully requests that the Examiner cite prior art references to meet his/her burden to show that such arrangement definitively are "Prior Art". Based upon the foregoing, reconsideration and withdrawal of the above-referenced objection to the drawings are respectfully requested. If FIG. labeling becomes the only issue barring allowance of the application, Applicant may be agreeable to label appropriate FIGS. as "Background", and in such situation, the Examiner is invited to call the undersigned at the local Washington, D.C. telephone number of 703-312-6600 in order to discuss the same.

REJECTIONS UNDER 35 USC §112 TRAVERSED

Claims 1-38 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for the concerns listed within the DETAILED ACTION section on page 3 of the Office Action. Ones of Applicant's claims have been amended in an attempt to improve a clarity of such claims.

Beyond the clarifying amendments, all objections under 35 U.S.C. §112, second paragraph are traversed. As stated in MPEP §2173.01 Claim Terminology:

A fundamental principle contained in 35 U.S.C. §112, second paragraph is that applicants are their own lexicographers. They can define in the claims what they regard as their invention essentially in whatever

terms they choose so long as the terms are not used ways that are contrary to accepted meanings in the art. Applicant may use functional language, alternative expressions, negative limitations, or any style expression or format of claim which makes clear the boundaries of the subject matter for which protection is sought. As noted by the court in *In re Swinehart*, 439 F.2d 210, 160 USPQ 226 (CCPA 1971), a claim may not be rejected solely because of the type of language used to define the subject matter for which patent protection is sought. (emphasis added)

With respect to independent claims 1 and 9, the Examiner contends "it is unclear how the support is between the electrical components." Applicant brings to the attention of the Examiner that, as recited in claims 1 and 9, in the words "a mechanical support" that the word "support" is a noun. As illustrated in Fig. 3, and as recited in claims 1 and 9, a mechanical support e.g., shunt 310 is illustrated as between electrical components e.g., substrate 130 and interfacing substrate 150 (page 7, lines 22-24):

the side view 300 illustrates example shunt(s) 310 shown both in a perspective view (bottom of the FIG), and in installed positions between the receiving substrate 130 and the semiconductor package 110 (emphasis added).

The Examiner also contends it is unclear how a mechanical support as recited in claims 1 and 9 is "providing support to the electrical components." As illustrated in Fig. 3, a mechanical support e.g., shunt 310 (page 7, lines 24-25) may be of conductive (e.g., metal, conductive polymer) material and may have a variety of shapes (e.g., bars, poles). Assuming *arguendo* that a mechanical support e.g., the shunt 310 is a metal bar, Applicant submits that it would be clear to one skilled in the art that a metal bar positioned as illustrated in Fig. 3, between electrical components e.g., receiving substrate 130 and semiconductor package 110, provides mechanical support as recited in claims 1 and 9.

The Examiner also contends that "as the claims read currently any rigid piece of conductive material would anticipate the claims." However, while a rigid piece of

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conductive material could *arguendo* be a mechanical support, claim 1 would not be anticipated unless such a rigid piece of conductive material also provided, as recited in claims 1 and 9, a:

shunt electrical conduction path for predetermined electrical current such that predetermined electrical current does not pass through grid array connectors of the grid-array.

Applicant submits that the structure which makes up the device is clearly and positively specified e.g., as recited in claims 1 and 9 a shunt/mechanical connector comprising a mechanical support that is a shunt electrical conduction path. In addition, Applicant submits that the structure is organized to present a complete operative device, e.g., as recited in claims 1 and 9 the mechanical support is between electrical components and provides a shunt electrical conduction path for predetermined current so such a current does not pass through connectors of mounted electrical components.

Likewise, with respect to independent claims 17 and 28, such claims recite a shunt/support member e.g., shunt 310 engageable with electrical components receiving substrate 130 and semiconductor package 110 to support and/or secure the components and having a conduction path to shunt current between the components. Applicant submits that the claims as written particularly point out and distinctly claim the subject matter and comply with 35 U.S.C. §112, and respectfully request that the rejections be withdrawn.

REJECTIONS UNDER 35 U.S.C. §102 TRAVERSED

All 35 U.S.C. §102 rejections as being anticipated by Figueroa et al. (U.S. Pat. No. 6,388,207) are traversed. Applicant contends that all of Applicants' claims 1-38 patentably distinguish over the reference. As to the requirements to support a

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rejection under 35 U.S.C. §102, reference is made to *In re Robertson*, 49 USPQ 2d 1949 (Fed. Cir. 1999), wherein the court pointed out that anticipation under 35 U.S.C. §102 requires that each and every element, and limitation, as set forth in the claim are described in a single prior art reference. The applied art does not adequately support a 35 U.S.C. §102 anticipatory-type rejection because, at minimum, such applied art does not disclose (nor suggest) the following discussed limitations of Applicant's claims.

Independent claims 1 and 9 (and claims dependent therefrom) recite a shunt/mechanical connector including a mechanical support. Figueroa et al. does not disclose (nor suggest) any type of mechanical connector, let alone a connector that also provides support. That is, Figueroa et al.'s die 50 and substrate 60 are interconnected using only a grid array. Further, Applicant's disclosed and claimed invention require the shunt/mechanical connector to be disposable or disposed in a location to directly contact the two discrete electrical components mountable together via a grid array. Figueroa et al.'s trenches are provided only within the substrate 60, and do not contact the die 50. Still further, Applicant's disclosed and claimed invention requires that the connector provide a shunt electrical conduction path for predetermined electrical current between the electrical components such that the predetermined electrical current does not pass through grid array connectors of the grid array. Since Figueroa et al. nowhere discloses (or suggests) a shunting connector, Figueroa et al. does not meet such feature/limitations of Applicant's claims. Since Figueroa et al. does not have a shunt connector, all of the current flowing between the Figueroa et al. die 50 and substrate 60, must flow through the grid array.

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Independent claims 17 and 28 (and claims dependent therefrom) recite a shunt/support device comprising a shunt/support member with electrical components to mechanically support and/or secure the electrical components with respect to each other. There is no reference, disclosure, or suggestion in Figueroa et al., whatsoever, as to a support device that mechanically supports and/or secures electrical components to one other. Similar arguments can be made to support such claims as was made above with respect to independent claims 1 and 9.

In fact, Figueroa et al. teaches away from Applicant's shunt and support device as the trench of Figueroa et al. is made by taking material away. For example, in Figueroa et al., (col. 10 lines 3-5):

trenches 132 and cavities 133 can be drilled or punched. Alternatively, they can be formed by imprinting or microperforation techniques

and, (col. 10, 28-30):

Sidewalls 134 are separated into individual trenches 101-114 through conventional subtractive techniques such as etching or drilling(emphasis added).

As all of Applicant's claims recite at least one element neither disclosed or suggested by Figureroa et al., Applicant submits that all claims present in this application patently distinguish over the cited art. Accordingly, early allowance of such claims is respectfully requested, and issuance of an action of a favorable nature is courteously solicited.

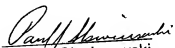
EXAMINER INVITED TO TELEPHONE

The Examiner is herein invited to telephone the undersigned attorney at the local Washington, D.C. area telephone number of 703-312-6600 to discuss any suggested actions for accelerating prosecution and moving the present application to allowance.

CONCLUSION

In view of the foregoing remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are in condition for allowance. Accordingly, early allowance of such claims is respectfully requested. To the extent necessary, Applicant petitions for an extension of time under 37 CFR §1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees and excess claim fees, to Deposit Account No. 01-2135 (Order No. 219.40775X00), and please credit any excess fees to such deposit account.

Respectfully submitted,



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703-312-6600

ATTACHMENTS:

Appendix - Version With Markings To Show Changes Made

APPENDIX - VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend the claims as follows. Note that the full text and/or status of all claims (including those not being amended within this paper) may also be included to provide the convenience of a complete set of claims for easy review:

1. (Amended) A shunt/mechanical connector comprising: disposable to directly contact two discrete electrical components mountable together via a grid array, the connector to provide mechanical support and to provide a shunt electrical conduction path for predetermined electrical current between the electrical components such that the predetermined electrical current does not pass through grid array connectors of the grid array. ~~grid array-mounted electrical components;~~ and
~~a mechanical support disposable between the electrical components to provide support thereto.~~

2. A shunt/mechanical connector as claimed in Claim 1, where the shunt electrical conduction path has a cross-sectional area greater than that of any one of the grid array connectors, so as to provide a lower resistance shunt path for current than the grid array connectors.

3. (Amended) A shunt/mechanical connector as claimed in Claim 1, where the ~~shunt electrical conduction path~~ shunt/mechanical connector has at least one contact to electrically contact at least one of a pad, a via, and predefined PCB

conductive patterns electrically connected to a power or ground plane of at least one of the electrical components.

4. A shunt/mechanical connector as claimed in Claim 1, where the shunt/mechanical connector is providable in a location in at least one of: a predetermined reserved component area of the grid array arrangements; within a grid array connector area having the plurality of grid array connectors; outside of the grid array connector area, but through any socket assembly providing the plurality of grid array connectors; and, outside of any socket assembly.

5. A shunt/mechanical connector as claimed in Claim 1, where the shunt/mechanical connector is substantially made of at least one of rigid electrically conductive sections formed as one of a molded, stamped, etched, extruded and deposited arrangement, and is capable of withstanding temperatures of at least a normal electrical component operation of the electrical components.

6. (Amended) A shunt/mechanical connector as claimed in Claim 1, the shunt/mechanical connector ~~arrangement~~ being one of provided separately from, and integrated with one of, the electrical components.

7. A shunt/mechanical connector as claimed in Claim 1, where one of the electrical components is one of: a motherboard, a printed circuit board (PCB); and a receiving substrate, and another of the electrical components is one of: a semiconductor package; a semiconductor package having an interposer; and an interfacing substrate.

8. (Amended) A shunt/mechanical connector as claimed in Claim 1, comprising a grid array mount being one of: a bump/ball grid array (BGA); a micro BGA (μ BGA); a pin grid array; and a micro pin grid array.

9. (Amended) A mounted electrical components arrangement comprising:
a plurality of ~~grid-array-mounted~~ discrete electrical components mounted together with a grid array; and
a shunt/mechanical connector ~~including~~ disposed to directly contact the electrical components, the connector to provide mechanical support and to provide a
shunt electrical conduction path for predetermined electrical current such that the
predetermined electrical current between the electrical components does not pass
through grid array connectors of the grid array. ~~grid-array-mounted electrical components, and a mechanical support between the electrical components to provide support thereto.~~

10. A mounted electrical components arrangement as claimed in Claim 9,
where the shunt electrical conduction path has a cross-sectional area greater than
that of any one of the grid array connectors, so as to provide a lower resistance
shunt path for current than the grid array connectors.

11. (Amended) A mounted electrical components arrangement as claimed in
Claim 9, where the ~~shunt electrical conduction path~~ shunt/mechanical connector has
at least one contact in electrical contact with at least one of a pad, a via, and

predefined PCB conductive patterns electrically connected to a power or ground plane of at least one of the electrical components.

12. (Amended) A mounted electrical components arrangement as claimed in Claim 9, where the shunt/mechanical connector is ~~providable~~ provided in a location in at least one of: a predetermined reserved component area of the grid array arrangements; within a grid array connector area having the plurality of grid array connectors; outside of the grid array connector area, but through any socket assembly providing the plurality of grid array connectors; and, outside of any socket assembly.

13. A mounted electrical components arrangement as claimed in Claim 9, where the shunt/mechanical connector is substantially made of at least one of rigid electrically conductive sections formed as one of a molded, stamped, etched, extruded and deposited arrangement, and is capable of withstanding temperatures of at least a normal electrical component operation of the electrical components.

14. A mounted electrical components arrangement as claimed in Claim 9, the shunt/mechanical connector being one of provided separately from, and integrated with one of, the electrical components.

15. A mounted electrical components arrangement as claimed in Claim 9, where one of the electrical components is one of: a motherboard, a printed circuit board (PCB); and a receiving substrate, and another of the electrical components is

one of: a semiconductor package; a semiconductor package having an interposer; and an interfacing substrate.

16. (Amended) A mounted electrical components arrangement as claimed in Claim 9, a where the grid array mount being one of: a bump/ball grid array (BGA); a micro BGA (μ BGA); a pin grid array; and a micro pin grid array.

17. (Amended) A shunt/support device comprising a shunt/support member disposable between to directly contact two discrete electrical components mountable together with opposing grid array arrangements having a plurality of grid array connectors, the shunt/support member engageable with the electrical components to at least one of mechanically support and secure the electrical components with respect to each other, and having also to provide at least one electrical conduction path electrically connectable so as to shunt more than a majority portion of at least one predetermined type of current flowable between the electrical components, from flowing through ones of the plurality of grid array connectors.

18. A shunt/support device as claimed in Claim 17, the shunt/support member being at least one shunt/support post disposable between the electrical components.

19. A shunt/support device as claimed in Claim 17, the shunt/support member disposable to shunt substantially all of the at least one predetermined type of current.

20. A shunt/support device as claimed in Claim 17, the shunt/support member being capable to shunt the more than a majority portion of the at least one predetermined type of current, by the at least one electrical conduction path having a lower electrical resistance for current flowable between the electrical components through the shunt/support device, in comparison to an electrical resistance through the ones of the plurality of grid array connectors.

21. A shunt/support device as claimed in Claim 20, with the at least one electrical conduction path having the lower electrical resistance by at least one of: having a current-carrying cross-sectional area measured perpendicularly across an electrical current flow direction therethrough which is greater than a corresponding cross-sectional area of the ones of the plurality of grid array connectors; and being constructed of material which is lower in electrical resistance than an electrical resistance of a material of the ones of the plurality of grid array connectors.

22. A shunt/support device as claimed in Claim 17, the at least one predetermined type of current being one of a power supply current, a grounding current, and a high-voltage current.

23. A shunt/support device as claimed in Claim 17, the shunt/support member being securable with the electrical components using at least one of solder, welding, at least one fastener, and glue, so as to mechanically secure the electrical components with respect to each other.

24. (Amended) A shunt/support device as claimed in Claim 17, the shunt/support member being disposable in a location in at least one of: a predetermined reserved component area of the grid array arrangements; within a grid array connector area having the plurality of grid array connectors; outside of the grid array connector area, but through any socket assembly providing the plurality of grid array connectors; and, outside of any socket assembly.

25. A shunt/support device as claimed in Claim 17, where one of the electrical components is one of: a motherboard, a printed circuit board (PCB); and a receiving substrate, and another of the electrical components is one of: a semiconductor package; a semiconductor package having an interposer; and an interfacing substrate.

26. A shunt/support device as claimed in Claim 17, the grid array arrangements being one of: a bump/ball grid array (BGA); a micro BGA (μ BGA); a pin grid array; and a micro pin grid array.

27. A shunt/support device as claimed in Claim 17, where the shunt/support member comprises aligner components to substantially align the opposing conductive grid-array patterns of the electrical components during mounting together thereof.

28. A system comprising:
electrical components mounted together with opposing grid array arrangements having a plurality of grid array connectors; and

a shunt/support device including a shunt/support member disposed between and engaged with the electrical components to at least one of mechanically support and secure the electrical components with respect to each other, and further including at least one electrical conduction path electrically connected so as to shunt more than a majority portion of at least one predetermined type of current flowable between the electrical components from flowing through ones of the plurality of grid array connectors.

29. A system as claimed in Claim 28, the shunt/support member being at least one shunt/support post disposable between the electrical components.

30. A system as claimed in Claim 28, the shunt/support member disposable to shunt substantially all of the at least one predetermined type of current.

31. A system as claimed in Claim 28, the shunt/support member being capable to shunt the more than a majority portion of the at least one predetermined type of current by the at least one electrical conduction path having a lower electrical resistance for current flowable between the electrical components through the shunt/support device, in comparison to an electrical resistance through the ones of the plurality of grid array connectors.

32. A system as claimed in Claim 28, with the at least one electrical conduction path having the lower electrical resistance by at least one of: having a current-carrying cross-sectional area measured perpendicularly across an electrical current flow direction therethrough which is greater than a corresponding cross-

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sectional area of the ones of the plurality of grid array connectors; and being constructed of material which is lower in electrical resistance than an electrical resistance of a material of the ones of the plurality of grid array connectors.

33. A system as claimed in Claim 28, the at least one predetermined type of current being one of a power supply current, a grounding current, and a high-voltage current.

34. A system arrangement as claimed in Claim 28, the shunt/support member being securable with the electrical components using at least one of solder, welding, at least one fastener, and glue, so as to mechanically secure the electrical components with respect to each other.

35. A system as claimed in Claim 28, the shunt/support device being disposable in a location in at least one of: a predetermined reserved component area of the grid array arrangements; within a grid array connector area having the plurality of grid array connectors; outside of the grid array connector area, but through any socket assembly providing the plurality of grid array connectors; and, outside of any socket assembly.

36. A system as claimed in Claim 28, where one of the electrical components is one of: a motherboard, a printed circuit board (PCB); and a receiving substrate, and another of the electrical components is one of: a semiconductor package; a semiconductor package having an interposer; and an interfacing substrate.

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37. A system as claimed in Claim 28, the grid array arrangements being one of: a bump/ball grid array (BGA); a micro BGA (μ BGA); a pin grid array; and a micro pin grid array.

38. A system as claimed in Claim 28, where the shunt/support member comprises aligner components to substantially align the opposing conductive grid-array patterns of the electrical components during mounting together thereof.

Please add the following claims:

39. (New) A shunt/mechanical connector as claimed in claim 1, wherein the shunt/mechanical connector is disposable as least partially sandwiched between the electrical components.

40. (New) A mounted electrical components arrangement as claimed in Claim 9, wherein the shunt/mechanical connector is disposable as least partially sandwiched between the electrical components.

41. (New) A shunt/support device as claimed in Claim 17, where the shunt/support member is disposable as least partially sandwiched between the electrical components.

42. (New) A system as claimed in Claim 28, where the shunt/support member is disposable as least partially sandwiched between the electrical components.